CLAIMS

We claim:

1.   A network analysis device for a digital data computer network, comprising:

         a digitizer which digitally samples analog characteristics of digital

5   communication events between network device connected to the network;

         a system processor which downloads data of the sampled signal events

from the digitizer, which analyzes the analog characteristics, and which

decodes the signal events, which are digital communications between the

devices, based on the data.

10   2.   A network analysis device as described in Claim 1, wherein the system

processor classifies the signal events as digital communications, noise,

interference and/or crosstalk.

3.   A network analysis device as described in Claim 2, wherein the system

processor classifies the signal events using parametric analysis of each event.

15   4.   A network analysis device as described in Claim 1, further comprising an

attachment unit, for connecting the digitizer to multiple links of the network

simultaneously.

5.   A network analysis device as described in Claim 4, wherein the digital data

network is a star-topology network and the attachment unit connects to

20   multiple links of the star topology.

6.   A network analysis device as described in Claim 3, wherein the attachment

unit comprises a tagging circuit that generates a signal that identifies the link

from which a sampled signal event originated to the system processor.

7.   A network analysis device as described in Claim 6, wherein the digital data network is a star-topology network and the tagging circuit generates the signal to identify the link of the star-topology network from which the sampled signal event originated.

5   8.   A network analysis device as described in Claim 1, wherein the system processor determines whether the network communications are within frequency and voltage specifications for the network.

9.   A network analysis device as described in Claim 1, further comprising an attachment unit which comprises receivers which detect signals on the

10   network and drivers which generate signals on the network.

10.   A network analysis device as described in Claim 1, further comprising an attachment unit which comprises:

            receivers which detect signals transmitted over links of the network; and

15   a summing circuit which combines the signals from each of the links on a channel of the digitizer.

11.   A network analysis device as described in Claim 10, wherein the attachment unit further comprises drivers which generate signals on each of the links.

20   12.   A network analysis device as described in Claim 1, wherein the system processor decodes the digital communications by comparing digital samples of the network transmission to a threshold; locating transitions in which successive digital samples change values relative to the threshold; comparing time periods between successive transitions to a bit period; and decoding only

25   transitions that are greater than the minimum period from a prior transition as transmitted data.

13.   A method for monitoring the operation of a computer network, comprising:

digitally sampling analog characteristics of signal events on the network with a digitizer;

downloading data arrays of the signal events to a system processor;

5   analyzing the data arrays in the system processor to identify the signal events;

determining analog characteristics of the signal events; and

decoding the signal events, which are digital communications between network devices, based on the data.

10   14.   A method as described in Claim 13, further comprising

classifying the events as collisions between network devices;

determining transmission start and stop times for colliders in collision signal events.

15.   A method as described in Claim 13, further comprising locating network
15   devices that improperly react to collisions with other network devices by reference to the start and stop times.

16.   A method as described in Claim 13, further comprising identifying sources of transmissions on a network by calculating parameters for transmissions from known sources, calculating the parameters for a transmission from an
20   unknown source, and identifying the unknown source based upon the degree to which the parameters match parameters from the known sources.

17.   A method as described in Claim 13, further comprising classifying the signal events as digital communications, noise, interference and/or crosstalk based on the analog characteristics.

18.   A method as described in Claim 13, further comprising classifying the signal events as digital communications, noise, interference and/or crosstalk based using parametric analysis of each event.

19.   A method as described in Claim 13, further comprising simultaneously connecting to multiple links of the network.

20.   A method as described in Claim 13, further comprising simultaneously connecting to multiple links of a star topology network.

21.   A method as described in Claim 20, further comprising tagging sampled signal events to identify the link from which the event originated.

22.   A method as described in Claim 20, further comprising determining whether the network communications are within frequency and voltage specifications for the network.

23.   A method as described in Claim 20, further comprising analyzing transmission characteristics of the network analysis by driving predetermined signal out onto the network and detecting the response of the network.